WOOD MOSAIC.

Mosaic work in a variety of forms is always pleasing when well done. Although its origin is obscure, yet for centuries it has been one of the most favored mediums of decoration. In one of the southern counties of England there is still plied a quaint inlaid wood industry which is a modern example of this art. This inlaid woodwork, known as "Tonbridge ware"—a name suggestive of pottery—consists of views, flowers, borders, and so forth, in all their natural colors, with minute pieces of variously colored woods, each measuring about a twentieth of an inch square. So accurately are these pieces of wood cut, even at these minute dimensions, and so neatly and closely are they glued together, that they resemble one solid piece of wood with the design painted upon it. Curiously enough it was painted drawings upon white wood that originally suggested and subsequently evolved into the present craft.

The principal woods employed in the art are American birch, mahogany, fustic, walnut—American and Spanish—plum tree, tulip—with its beautiful fruit—red grain, cocus, snake wood, nutmeg, rosewood, mulberry, laburnum, box, peach, acacia, maple and Hungarian ash, with its charming silky luster and moiré grain. In short, no wood is useless for the craft so long as it does not contain too great a quantity of sap, although a remedy is found in the case of one or two necessary woods, such as the holly, which is boiled for several hours, an operation not only removing all the sap, but bleaching the wood considerably as well. There is one color, however, which has always puzzled the artist. Up to the present, no tree has been discovered the hue of whose wood is gray, and to supply this deficiency birds' eye maple and Hungarian ash are steeped for several weeks in the indigenous chalybeate waters, which convert the yellowish whiteness of these two woods into a soft steel-gray.

When it is proposed to inlay a certain view, border, or collocation of flowers in wood, a colored design is first of all prepared upon a piece of paper divided into squares of about the eighth of an inch in measurement. The design prepared, the workman proceeds to set it up in wood. This entails great labor and care, for in addition to being a skilled mechanic some artistic sense is absolutely essential in the judicious selection and composition of the different colored woods to obtain the necessary realistic effect. On all sides of him, within an arm's length, are ranged little piles of thin narrow slips of wood, each slip measuring about three and a half inches in length by about an inch broad, and varying from a twentieth to a twelfth of an inch in thickness. The workman begins at the bottom left hand corner of the squared design and takes the first set of squares and works across the drawing in a vertical direction. Suppose, for instance, he has to make a bouquet of flowers. He refers to the bottom left hand corner square of the pattern and finds that it forms part of the groundwork of the design; that is to say, no portion of the drawing encroaches upon that square. As the groundwork is invariably white, he selects a slip of white wood from one of the little piles and lays it flat down upon his bench. Then he proceeds to the next square above. This occupies a portion of the design—the end of a petal or a leaf. This is green, and he therefore selects a piece of wood of the correct greenish shade, and places this piece upon the former slip and proceeds to the next square above, and so on until he has worked his way right across the design, taking each square one by one and superposing their corresponding colored slips of wood, in their order of sequence in a little pile by his side. He then glues and presses these little slips tightly together in a little block, three and a half inches long, one inch wide, and two or three inches in thickness, composed of thin little strips of variegated wood. He labels this "number one" and proceeds to set up the second line of squares upon the drawing in a similar manner, which he afterward glues up and consecutively numbers; and so on until he has so constructed the whole design. If the drawing is a very large one, he may have as many as two hundred of these blocks of glued strips of wood. A thin veneer about the twentieth of an inch thick is now longitudinally cut from block number one. As he has now cut the reverse way of the wood, this veneer consists of a number of little frail sticks, three and a half inches in length and about a twentieth of an inch square, firmly held together by the glue. He lays this upon his bench, cuts a similar veneer from each of the other blocks, and glues them together in regular order. This block is now subjected to tremendous pressure to drive out all the superfluous glue and to unite the thin frail pieces of wood firmly together. In this block, the artist has obtained an exact and complete facsimile, square for square, of the drawing. When thoroughly dry, veneers are again longitudinally cut from this block, and each veneer is a replica of the pattern. Out of a block three and a half inches in thickness it is possible to obtain as many as thirty veneers.

Our illustration of a street conveys a comprehensive idea of the work at this stage. It appears to be an indistinguishable conglomeration of a number of small blocks of wood, and presents a blurred and fuzzy appearance, like a photograph very much out of focus. This particular design only measures six inches by four and a half, yet there are no less than 32,600 pieces of wood, extending over one hundred different colors, utilized in its composition.

Contains 32,600 pieces and over 100 different natural wood colors.

WOOD MOSAIC—THE PICTURE, WITH THE BLOCKS IN THE ROUGH STAGE.

THE ASSAYING OF GOLD AND SILVER ORES.

BY WILLIAM B. GAMBLE.

The assayer's first operation consists of a thorough sampling of the ore. The reason is plain. Metal-bearing rocks are not at all homogeneous. Barren quartz is often found next to mineral assaying thousands of dollars to the ton. The amount to be assayed must be made to represent as accurately as possible the average of the whole lot.

The ore is first sampled as it comes from the mine, and later at the smelter, chlorination works, or cyanide plant, as the case may be. When mechanical samplers are not employed, the general practice is to throw aside every fifth shovelful into a conical pile, which is afterward divided vertically into four equal parts—or "quartered" as the operators say. Opposite segments are withdrawn and thoroughly mixed together. This operation is repeated until the sample is of a convenient size, when it must be passed through a small hand crusher. The latter should be thoroughly clean—a safeguard against error, which is possible when rich ore has been previously crushed. The writer knows of several cases in which the ore from a worthless prospect has assayed like that from a dividend-paying mine—a result due to carelessness in this particular.

In many cases the sample is still too large when it comes from the crusher, and it must be further reduced until it can be conveniently handled on the apparatus about to be described. The latter consists of an iron plate two feet square and provided with flanges at the two sides in order that the ore may not be brushed aside. This device is known as the bucking-board. Its complement, called the muller, is a piece of cast iron resembling an ordinary cigar box in size and form. This is manipulated by a long handle parallel to the upper surface. The lower surface is convex, so that a rocking motion may be imparted to the whole.

The bucking-board having been cleaned and the sample spread over its surface, the operator, with a backward and forward motion of the muller, grinds the ore to a pulp sufficiently fine to pass through an eighty-mesh screen. When this operation is completed the screen should be examined for any particles of free gold which may have clung to the wires. If any are found they must be weighed and their total value computed in relation to the weight of the whole pulp sample. The value to the ton is very easily calculated—which figure must be included in the final assay result.

After the pulp has been rendered homogeneous by rolling it in a small piece of oilcloth it is spread into a thin layer, from which small portions are taken until an amount known as half of an assay ton is obtained.

Here it is necessary to explain the system of assay weights. As I have before mentioned, gold and silver ores are valued by the amounts of these metals contained in the ton of rock. These amounts are generally expressed in ounces troy. Of course, any system of weights might be used and the final result calculated in ounces to the ton. But the assayer is a busy man who shortens his labors whenever he may do so without a sacrifice of accuracy.

This is a convenient place briefly to mention the scales used in assaying. There are generally two: those for weighing the pulp sample, and the "button scales" for weighing the metals obtained. The latter, which are provided with a rider, or hook, adjustable along the beam, weigh correctly to the one one-hundredth part of a milligramme, or less than two ten thousandths of a grain.

Now the problem in establishing a system of assay weights is to read milligrammes and fractions thereof as so many ounces to the ton directly from the button scales. The matter, of course, is simply one of proportion; it being necessary to weigh out an amount on the pulp scales which shall bear the same relation to a milligramme as a ton does to an ounce. We know that there are 29,166·66 ounces troy in the ton of two thousand pounds. Therefore 29,166 milligrammes is the pro-

THE ASSAYING OF GOLD AND SILVER ORES.